CLAIMS

What is claimed is:

1. A continuous blood glucose monitoring system comprising:

a system configured to continuously receive data from blood glucose monitoring sensors;

the system configured to convert sensor data into current blood glucose concentration values;

the system configured to support continuously fluctuating blood glucose notification threshold profiles;

the continuously fluctuating blood glucose notification threshold profiles comprising:

an upper blood glucose concentration threshold function;

a lower blood glucose concentration threshold function;

the threshold functions comprising specific values at specific times;

the system configured to compare a current blood glucose concentration value with a corresponding upper blood glucose concentration threshold value;

the system configured to compare a current blood glucose concentration value with a corresponding lower blood glucose concentration threshold value;

the system configured to alert a user when a current blood glucose concentration value is greater than a corresponding upper blood glucose concentration threshold value;

and the system configured to alert a user when a current blood glucose concentration value is less than a corresponding lower blood glucose concentration threshold value.

2. The system of claim 1 configured to alert a user when one or more events comprising:

a predetermined period of time passing since threshold profile activation;

a predetermined time of day occurring;

a user maintaining current blood glucose concentration within the threshold profile range for a predetermined period of time;

a current blood glucose concentration crossing a static threshold which is independent of a threshold profile;

a rate of change of current blood glucose concentration exceeding a threshold rate of change;

a rate of change of current blood glucose concentration falling below a threshold rate of change;

a current blood glucose concentration percentage rate of change exceeding a threshold percentage rate of change;

a current blood glucose concentration percentage rate of change falling below a threshold percentage rate of change;

a second derivative of current blood glucose concentration exceeding a threshold second derivative of blood glucose concentration over time;

a second derivative of current blood glucose concentration falling below a threshold second derivative of blood glucose concentration over time;

occurs.

3. The system of claim 2 wherein the alert comprises one or more of: a visual alert; an auditory alert; a tactile alert.

4. The system of claim 1 further comprising a graphic display capable of displaying one or more graphs comprising:

a graph of an upper blood glucose concentration threshold function;

a graph of a lower blood glucose concentration threshold function;

a graph of an expected blood glucose concentration function;

a graph of measured blood glucose concentration.

5. The system of claim 4 wherein

a graph of an upper blood glucose concentration threshold function is displayed in a first color;

a graph of a lower blood glucose concentration threshold function is displayed in a second color;

a graph of an expected blood glucose concentration function is displayed in a third color;

a graph of measured blood glucose concentration is displayed in a fourth color.

6. The system of claim 5 wherein the first color and the second color are the same color.

7. The system of claim 1 further comprising a data store configured to support storage and retrieval of blood glucose-related data.

8. The system of claim 7 wherein the data are labeled.

9. The system of claim 7 configured to allow a user to define a blood glucose threshold profile by using a method comprising one or more steps of:

the step of retrieving a blood glucose threshold profile from a data store;

the step of retrieving a blood glucose threshold profile from a data store and the further step of modifying the blood glucose threshold profile;

the step of retrieving an expected blood glucose concentration function from a data store;

the step of retrieving an expected blood glucose concentration function from a data store and the further step of modifying the expected blood glucose concentration function;

the step of retrieving an upper blood glucose concentration threshold function from a data store;

the step of retrieving an upper blood glucose concentration threshold function from a data store and the further step of modifying the upper blood glucose concentration threshold function;

the step of retrieving a lower blood glucose concentration threshold function from a data store;

the step of retrieving a lower blood glucose concentration threshold function from a data store and the further step of modifying the lower blood glucose concentration threshold function.

10. The system of claim 7 configured to allow a user to define a blood glucose threshold profile by:

the system analyzing recent measured blood glucose concentration data;

the system retrieving from a data store at least one blood glucose-related data item based upon the analysis of recent measured blood glucose concentration data, wherein the at least one data item comprises one or more of:

a threshold profile data item;

an upper blood glucose concentration threshold function data item;

a lower blood glucose concentration threshold function data item;

an expected blood glucose concentration function data item;

the system optionally modifying the at least one blood glucose-related data item based upon the analysis of recent measured blood glucose concentration data;

the system presenting the at least one blood glucose-related data item to the user;

the system allowing the user to select a blood glucose-related data item;

and the system optionally allowing the user to modify the selected blood glucose-related data item.

11. The system of claim 1 configured to allow a user to define a blood glucose threshold profile by a method comprising one or more steps of:

the step of drawing the graph of an upper blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of drawing the graph of a lower blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of spotting points defining an upper blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of spotting points defining a lower blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of entering numeric data defining an upper blood glucose concentration threshold function using a device capable of accepting numeric input;

the step of entering numeric data defining a lower blood glucose concentration threshold function using a device capable of accepting numeric input;

the step of drawing a graph of an expected blood glucose concentration function using a device capable of accepting graphic input;

the step of spotting points defining an expected blood glucose concentration function using a device capable of accepting graphic input;

the step of entering numeric data defining an expected blood glucose concentration function using a device capable of accepting numeric input.

12. The system of claim 1 wherein the duration of the threshold profile is from about one hour to about twelve hours.

13. A method of using a continuous blood glucose monitoring system comprising the steps of:

defining a continuously fluctuating blood glucose notification threshold profile comprising:

an upper blood glucose concentration threshold function;

a lower blood glucose concentration threshold function;

the upper and lower blood glucose concentration threshold functions forming the bounds of an expected blood glucose concentration range for the duration of the threshold profile;

the threshold functions comprising specific values at specific times;

activating the threshold profile;

continuously receiving data from blood glucose monitoring sensors;

converting the sensor data to current blood glucose concentration values;

comparing a current blood glucose concentration value to a corresponding upper blood glucose concentration threshold value;

comparing a current blood glucose concentration value to a corresponding lower blood glucose concentration threshold value;

alerting a user if the current blood glucose concentration value is greater than the corresponding upper blood glucose concentration threshold value;

and alerting a user if the current blood glucose concentration value is less than the corresponding lower blood glucose concentration threshold value.

14. The method of claim 13 further comprising the step of alerting a user when one or more events comprising:

a predetermined amount of time passing since threshold profile activation;

a predetermined time of day occurring;

a user maintaining current blood glucose concentration within the threshold profile range for a predetermined period of time;

a current blood glucose concentration crossing a static threshold which is independent of a threshold profile;

a rate of change of current blood glucose concentration exceeding a threshold rate of change;

a rate of change of current blood glucose concentration falling below a threshold rate of change;

a current blood glucose concentration percentage rate of change exceeding a threshold percentage rate of change;

a current blood glucose concentration percentage rate of change falling below a threshold percentage rate of change;

a second derivative of current blood glucose concentration exceeding a threshold second derivative of blood glucose concentration over time;

a second derivative of current blood glucose concentration falling below a threshold second derivative of blood glucose concentration over time;

occurs.

15. The method of claim 13 wherein the alert comprises one or more of: a visual alert; an auditory alert; a tactile alert.

16. The method of claim 13 further comprising the step of displaying, on a graphic display, one or more graphs comprising:

a graph of an upper blood glucose concentration threshold function;

a graph of a lower blood glucose concentration threshold function;

a graph of an expected blood glucose concentration function;

a graph of measured blood glucose concentration.

17. The method of claim 16 wherein

a graph of an upper blood glucose concentration threshold function is displayed in a first color;

a graph of a lower blood glucose concentration threshold function is displayed in a second color;

a graph of an expected blood glucose concentration function is displayed in a third color;

a graph of measured blood glucose concentration is displayed in a fourth color.

18. The method of claim 17 wherein the first color and the second color are the same color.

19. The method of claim 13 further comprising the steps of storing blood glucose-related data in a data store and retrieving blood glucose-related data from a data store.

20. The method of claim 19 wherein the data are labeled.

21. The method of claim 19 further comprising one or more steps of:

the step of retrieving a blood glucose threshold profile from a data store;

the step of retrieving a blood glucose threshold profile from a data store and the further step of modifying the blood glucose threshold profile;

the step of retrieving an expected blood glucose concentration function from a data store;

the step of retrieving an expected blood glucose concentration function from a data store and the further step of modifying the expected blood glucose concentration function;

the step of retrieving an upper blood glucose concentration threshold function from a data store;

the step of retrieving an upper blood glucose concentration threshold function from a data store and the further step of modifying the upper blood glucose concentration threshold function;

the step of retrieving a lower blood glucose concentration threshold function from a data store;

the step of retrieving a lower blood glucose concentration threshold function from a data store and the further step of modifying the lower blood glucose concentration threshold function;

whereby the user may define a threshold profile.

22. The method of claim 19 further comprising the steps of:

the system analyzing recent measured blood glucose concentration data;

the system retrieving from a data store at least one blood glucose-related data item based upon the analysis of recent measured blood glucose concentration data, wherein the at least one data item comprises one or more of:

a threshold profile data item;

an upper blood glucose concentration threshold function data item;

a lower blood glucose concentration threshold function data item;

an expected blood glucose concentration function data item;

the system optionally modifying the at least one blood glucose-related data item based upon the analysis of recent measured blood glucose concentration data;

the system presenting the at least one blood glucose-related data item to the user;

the system allowing the user to select a blood glucose-related data item;

and the system optionally allowing a user to modify the selected data item;

whereby the user may define a threshold profile.

23. The method of claim 13 further comprising one or more steps of:

the step of drawing the graph of an upper blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of drawing the graph of a lower blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of spotting points defining an upper blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of spotting points defining a lower blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of entering numeric data defining an upper blood glucose concentration threshold function using a device capable of accepting numeric input;

the step of entering numeric data defining a lower blood glucose concentration threshold function using a device capable of accepting numeric input;

the step of drawing a graph of an expected blood glucose concentration function using a device capable of accepting graphic input;

the step of spotting points defining an expected blood glucose concentration function using a device capable of accepting graphic input;

the step of entering numeric data defining an expected blood glucose concentration function using a device capable of accepting numeric input.

24. The method of claim 13 wherein the duration of the threshold profile is from about one to about twelve hours.

25. A computer readable medium comprising executable processor code configured to support a continuous blood glucose monitoring system;

the code comprising:

code for receiving data from continuous blood glucose monitoring sensors;

code for converting blood glucose sensor data into current blood glucose concentration values;

code supporting continuously fluctuating blood glucose notification threshold profiles;

the threshold profiles comprising:

an upper blood glucose concentration threshold function;

a lower blood glucose concentration threshold function;

the threshold functions comprising specific values at specific times;

code for comparing a current blood glucose concentration value with a corresponding upper blood glucose concentration threshold value;

code for comparing a current blood glucose concentration value with a corresponding lower blood glucose concentration threshold value;

code for alerting a user when a current blood glucose concentration is greater than a corresponding upper blood glucose concentration threshold value;

and code for alerting a user when a current blood glucose concentration is less than a corresponding lower blood glucose concentration threshold value.

26. The computer readable medium of claim 25 further comprising code configured to alert a user when one or more events comprising:

a predetermined period of time passing since threshold profile activation;

a predetermined time of day occurring;

a user maintaining current blood glucose concentration within the threshold profile range for a predetermined period of time;

a current blood glucose concentration crossing a static threshold which is independent of a threshold profile;

a rate of change of current blood glucose concentration exceeding a threshold rate of change;

a rate of change of current blood glucose concentration falling below a threshold rate of change;

a current blood glucose concentration percentage rate of change exceeding a threshold percentage rate of change;

a current blood glucose concentration percentage rate of change falling below a threshold percentage rate of change;

a second derivative of current blood glucose concentration exceeding a threshold second derivative of blood glucose concentration over time;

a second derivative of current blood glucose concentration falling below a threshold second derivative of blood glucose concentration over time;

occurs.

27. The computer readable medium of claim 26 wherein the alert comprises one or more of: a visual alert; an auditory alert; a tactile alert.

28. The computer readable medium of claim 25 further comprising code supporting a graphic display capable of displaying one or more graphs comprising:

a graph of an upper blood glucose concentration threshold function;

a graph of a lower blood glucose concentration threshold function;

a graph of an expected blood glucose concentration function;

a graph of measured blood glucose concentration.

29. The computer readable medium of claim 28 further comprising code wherein:

a graph of an upper blood glucose concentration threshold function is displayed in a first color;

a graph of a lower blood glucose concentration threshold function is displayed in a second color;

a graph of an expected blood glucose concentration function is displayed in a third color;

a graph of measured blood glucose concentration is displayed in a fourth color.

30. The computer readable medium of claim 29 further comprising code wherein the first color and the second color are the same color.

31. The computer readable medium of claim 25 further comprising code supporting a data store configured to support storage and retrieval of blood glucose-related data.

32. The computer readable medium of claim 31 further comprising code supporting labeled data.

33. The computer readable medium of claim 31 further comprising code configured to allow a user to define a blood glucose threshold profile by using a method comprising one or more steps of:

the step of retrieving a blood glucose threshold profile from a data store;

the step of retrieving a blood glucose threshold profile from a data store and the further step of modifying the blood glucose threshold profile;

the step of retrieving an expected blood glucose concentration function from a data store;

the step of retrieving an expected blood glucose concentration function from a data store and the further step of modifying the expected blood glucose concentration function;

the step of retrieving an upper blood glucose concentration threshold function from a data store;

the step of retrieving an upper blood glucose concentration threshold function from a data store and the further step of modifying the upper blood glucose concentration threshold function;

the step of retrieving a lower blood glucose concentration threshold function from a data store;

the step of retrieving a lower blood glucose concentration threshold function from a data store and the further step of modifying the lower blood glucose concentration threshold function.

34. The computer readable medium of claim 31 further comprising code configured to allow a user to define a blood glucose threshold profile;

the code comprising:

code for analyzing recent measured blood glucose concentration data;

code for retrieving from a data store at least one blood glucose-related data item based upon the analysis of recent measured blood glucose concentration data, wherein the at least one data item comprises one or more of:

a threshold profile data item;

an upper blood glucose concentration threshold function data item;

a lower blood glucose concentration threshold function data item;

an expected blood glucose concentration function data item;

code for optionally modifying the at least one blood glucose-related data item based upon the analysis of recent measured blood glucose concentration data;

code for presenting the at least one blood glucose-related data item to the user;

code for allowing the user to select a blood glucose-related data item;

and code for optionally allowing the user to modify the selected blood glucose-related data item.

35. The computer readable medium of claim 25 further comprising code configured to allow a user to define a blood glucose threshold profile by using a method comprising one or more steps of:

the step of drawing the graph of an upper blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of drawing the graph of a lower blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of spotting points defining an upper blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of spotting points defining a lower blood glucose concentration threshold function using a device capable of accepting graphic input;

the step of entering numeric data defining an upper blood glucose concentration threshold function using a device capable of accepting numeric input;

the step of entering numeric data defining a lower blood glucose concentration threshold function using a device capable of accepting numeric input;

the step of drawing a graph of an expected blood glucose concentration function using a device capable of accepting graphic input;

the step of spotting points defining an expected blood glucose concentration function using a device capable of accepting graphic input;

the step of entering numeric data defining an expected blood glucose concentration function using a device capable of accepting numeric input.

36. The computer readable medium of claim 25 further comprising code to support a threshold profile duration from about one hour to about twelve hours.